

WE CLAIM:

1 ~~Sub~~ 1 ✓ A safety insert designed to be mounted in an assembly comprising
2 a tire and a rim of a vehicle and radially on the outside of the rim, said insert having a
3 radially outer bearing surface which defines a radial bearing for the crown of the tire
4 when said tire is deflated and means for generating vibrating warning signals on a run-flat
5 condition, characterized in that said means generate signals oriented parallel to the axis of
6 rotation of the tire and rim assembly.

1 2. A safety insert according to Claim 1, in which the bearing surface
2 of the insert presents a variation of transverse position according to the azimuth of said
3 bearing.

1 3. A safety insert according to Claim 1, in which the bearing surface
2 of the insert contains straight ribs, the circumferential orientation of which varies with
3 their azimuth.

1 4. A safety insert according to Claim 1, in which the bearing surface
2 of the insert contains elements generating a transverse stress upon their radial
3 compression.

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- 1 *Sub A* 5. A safety insert according to Claim 4, in which the elements
2 *incisions* comprise ribs or ~~strips~~ whose inclinations relative to a longitudinal plane vary with their
3 azimuth.

- 1 *Sub B* 6. A safety insert according to Claim 4, in which the bearing surface
2 has an appreciably constant rolling radius under bearing.

- 1 7. A safety insert according to Claim 1, in which the bearing surface
2 presents at least two axially adjacent zones, the zone intended to be placed outward from
3 the vehicle not containing means for generating signals oriented parallel to the axis of
4 rotation of the tire and rim assembly.

- 1 8. A safety insert according to Claim 1, including means for
2 generating vertical signals.

- 1 9. A safety insert according to Claim 1, in which the bearing surface
2 contains an active zone of generation of signals, such that said signals present a
3 maximum preceded and followed by a minimum in the opposite direction.

- 1 10. A safety insert according to Claim 9, in which said active zone lies
2 between $\frac{1}{4}$ and $\frac{1}{2}$ of the circumference of said insert.

1 ~~Sub 2~~ 11. A safety insert according to Claim 9, in which the absolute value of
2 the minima of the signal generated lies between $\frac{1}{4}$ and $\frac{3}{4}$ of the absolute value of the
3 maximum.

1 ~~12.~~ A device for detecting the bearing of a tire of a vehicle, equipped
2 with a plurality of tire, rim and safety insert assemblies, the insert of each assembly being
3 mounted between the rim and the radially inner face of the tire tread, on the
4 corresponding safety insert, each assembly being capable of triggering the emission of a
5 vibrating signal when the tire comes in contact with the insert after a pressure loss in the
6 tire, comprising means of detection and treatment of said vibrating signal, including a
7 single sensor capable of being mounted on the vehicle and sensitive to the signals emitted
8 by each of the said assemblies, when the corresponding tire comes in contact with the
9 respective insert, and an indicator capable of signaling to the occupant of the vehicle a
10 run-flat condition in response to a signal picked up by said sensor.

1 13. A device according to Claim 12, in which the vibrating signal is
2 maintained by running flat.

1 14. A device according to Claim 12, including a pressure-sensitive
2 generator and in which the vibrating signal is a signal emitted by a pressure-sensitive
3 generator.

1 15. A device according to Claim 12, in which the vibrating signal is an
2 acoustic signal.

1 16. A device for detection of bearing of a tire of a vehicle, equipped
2 with a plurality of tire, rim and safety insert assemblies in which the safety inserts are
3 mounted between the rim and the radially inner face of the tire tread, on the
4 corresponding safety insert, each assembly being capable of transmitting a characteristic
5 vibration to the chassis of the vehicle in response to the bearing of one of the tires on the
6 corresponding safety insert as a result of a pressure loss in the tire, comprising:

- 7 - means of detection and treatment of such predetermined
8 characteristic mechanical vibration of the chassis of the vehicle;
9 and
10 - means of transmission of an alarm.

1 17. A device according to Claim 16, in which the vehicle has at least
2 two axles and the means of detection of a predetermined characteristic vibration of the
3 chassis of the vehicle comprise one and not more than one sensor per axle of said vehicle.

1 18. A device according to Claim 17, in which the means of detection
2 of a predetermined vibration of the chassis of the vehicle comprise a single sensor
3 connected to the vehicle.

1 19. A device according to Claim 18, in which the means of detection
2 of a predetermined characteristic vibration of the vehicle comprise a single sensor rigidly
3 connected to the chassis of the vehicle.

1 20. A device according to Claim 16, in which the characteristic
2 vibration transmitted to the chassis by the tire, rim and insert assembly includes a
3 component oriented parallel to the axis of rotation of said assembly.

1 21. A device according to Claim 12 or Claim 16, in which the
2 treatment means calculate a first characteristic magnitude in at least a first given
3 frequency band, calculate a criterion C corresponding to a given combination of the
4 preceding first characteristic magnitude or magnitudes, compare that criterion C to a
5 given threshold and trip an alarm when the result of the comparison follows a given ratio.

1 22. A device according to Claim 21, in which, for each of the axles of
2 the vehicle, the treatment means calculate a first characteristic magnitude in at least a first
3 frequency band specific to said axle of the vehicle.

1 23. A device according to Claim 22, in which the treatment means
2 calculate a criterion C corresponding to a weighted value of said first characteristic
3 magnitudes of said first frequency bands specific to said axles of the vehicle.

1 24. A device according to Claim 21, in which the first frequency band
2 or bands lie between 20 and 100 Hz.

1 25. A device according to Claim 21, in which the treatment means
2 further determine the frequency of rotation of the tire and in which said first frequency
3 band or bands are narrow frequency bands, each centered on a multiple frequency of said
4 frequency of rotation of the tire.

1 26. A device according to Claim 25, in which said first frequency band
2 or bands lie between 10 and 200 Hz.

1 27. A device according to Claim 21, in which the means of treatment
2 of the vibrations of the chassis further calculate a second characteristic magnitude in at
3 least a given second frequency band, so that, in said second band, said vibrations are
4 appreciably independent of bearing of the tire on its safety insert and so that the alarm
5 tripping threshold is a function of said second characteristic magnitude.

1 28. A device according to Claim 27, in which said second frequency
2 band lies between 3 and 7 Hz.

1 29. A device according to Claim 27, in which said second frequency
2 band lies between 100 and 200 Hz.

1 30. A device according to Claim 27, in which said second bands are
2 situated outside the multiple frequencies of the frequency of rotation of the tire.

1 31. A device according to Claim 21, in which the characteristic
2 magnitude measured is the vibrational energy of the signals expressed by the rms value.

1 32. A device according to one of Claims 12 or 16, in which the
2 treatment means do not transmit any alarm when the speed of the vehicle is below a given
3 threshold.

Subst. 1 33. A tire designed to equip a tire, wheel and safety insert assembly in
2 which the safety insert is mounted between the rim and the radially inner face of the tire
3 tread, characterized in that said tire is equipped with means capable of generating a
4 vibrating signal when said tire comes in contact with a corresponding insert following a
5 pressure loss in said tire.